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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,009	12/28/2005	Toru Sawada	81844.0048	4064

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EXAMINER	
BERDICHEVSKY, MIRIAM	
ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
11/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,009	SAWADA ET AL.	
	Examiner	Art Unit	
	MIRIAM BERDICHEVSKY	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/27/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

Claim 1 has been amended. Claims 1-8 are currently pending.

Status of Rejections

All rejections from the previous office action are maintained.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe (US 4776894)

As to claim 1, Watanabe teaches a silicon based thin film solar cell, wherein a conducted type silicon based low refractive index layer (column 4, lines 36-58) and a silicon based interface layer are disposed in this order on a backside of a photoelectric conversion layer observed from a light incident side (column 4, lines 17-32; claim 7).

Regarding claim 2, as there is no structural difference, the low refractive index layer with a crystalline component and a silicon based interface layer will inherently have a refractive index of not more than 2.5 at a wavelength of 600 nm.

Regarding claim 3, Watanabe teaches that the most abundantly existing constituent element, excluding silicon, in the silicon based low refractive index layer is not less than 25 atomic % (column 8, lines 36-39; claim 7).

Regarding claim 4, Watanabe teaches that the most abundantly existing constituent element is oxygen (a-SiO_x) (column 4, lines 36-48; claim 7).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe as applied to claim 1 above, in view of Yamagishi (US 4926230).

Applicant is directed to the paragraphs above for a complete discussion of Watanabe.

Regarding claim 5, Watanabe is silent to the silicon based low refractive index layer has a thickness of not less than 300 angstroms.

Yamagishi teaches that the silicon based low refractive index layer has a thickness of not less than 300 angstroms (column 2, lines 38-41).

Regarding claim 7, Watanabe is silent to the silicon based low refractive index layer has a thickness of not more than 150 angstroms.

Yamagishi teaches that the silicon based interface layer has a thickness not more than 150 angstroms (column 2, lines 38-41).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the thickness of the silicon based low refractive index layer of Yamagishi in Watanabe because the layer increases efficiency by promoting recombination of free electrons with electron holes, as taught by Yamagishi (column 2, lines 42-48).

6. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe as applied to claims 1 (Claim 6) and to claims 1 and 7 (Claim 8) above, in view of Nakamura (JP 59035016).

Applicant is directed to the paragraphs above for a complete discussion of Watanabe.

Regarding claims 6 and 8, Watanabe is silent to the silicon based low refractive index layer comprises a crystalline silicon component in the layer.

Nakurama teaches that the silicon based low refractive index layer comprises a crystalline silicon component in the layer (abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the layer with a crystalline component of Nakamura in Yagashimi because the solar cell will have the merits of both phases, as taught by Nakamura (abstract). Amorphous silicon has the advantage that it can be easily deposited over large areas while the advantage of crystalline silicon is the increased stability against light exposure.

Response to Arguments

7. Applicant's arguments filed 8/12/2008 have been fully considered but they are not persuasive. Applicant argues that Watanabe merely teaches a tandem pin/pin structure. The Examiner respectfully disagrees. Watanabe teaches that the inclusion of two silicon based impurity layers (containing for example, oxygen) for improving the photoelectric conversion efficiency (col. 2, lines 17-24; claim 7). As both impurity layers are disposed on the backside of the first light incident photoelectric conversion layers (64 and 74 disposed on 62, 61, 63; Figure 12) followed by a back electrode (5; Figure 12) the impurity layers of Watanabe read on the low refractive index layer and silicon based interface layer of the instant claim 1.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **MIRIAM BERDICHEVSKY** whose telephone number is (571)270-5256. The examiner can normally be reached on M-Th, 10am-8pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./
Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795